

Description of a new Peruvian *Athyreus* with notes on the Method of Illustration

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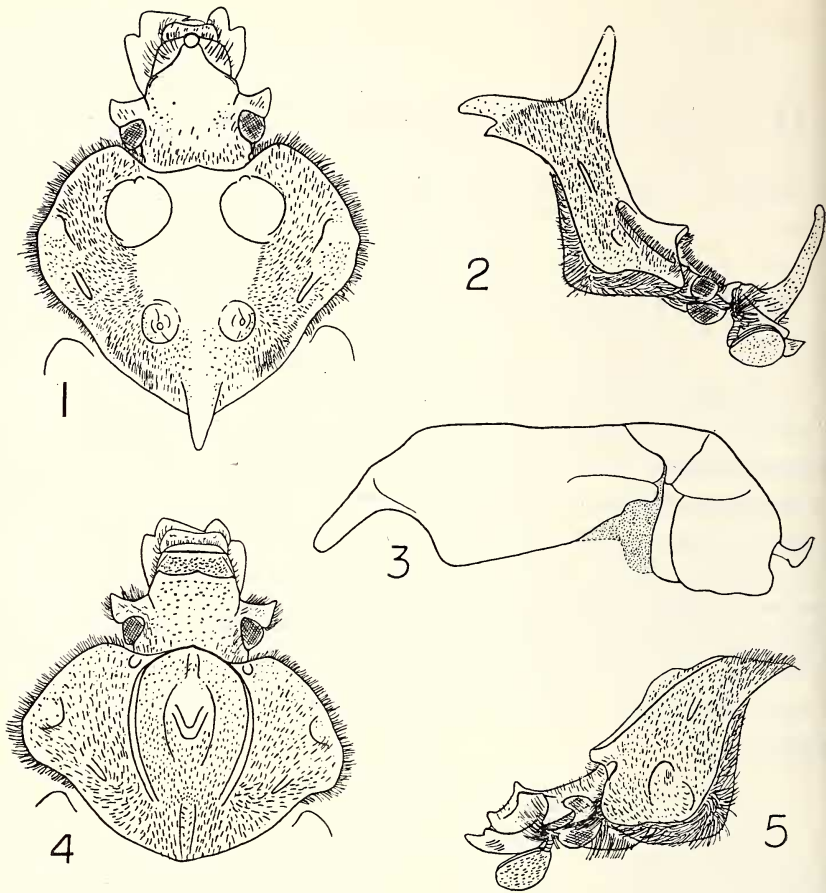
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The species described below belongs to the *Athyreus tribuliformis* group, which has recently been reviewed by Dr. Antonio Martinez (1953). The species is named for Dr. Martinez in recognition of his work on the South American Scarabaeidae and in appreciation of the aid he has given the writer. I am also indebted to Mr. G. Frey of Munich, Germany, who kindly loaned the specimens described and to Dr. William Anderson, U. S. National Museum, for assistance in the procurement of some necessary literature. Mr. W. J. Cloyd, University of Tennessee, aided the writer considerably with the portions of the paper dealing with photography.

Athyreus martinezi n. sp.

H o l o t y p e : Male, length 20.5 mm.; greatest width 12.8 mm. Dorsally color is a chestnut brown, slightly lighter near the lateral thoracic margins. The labrum is broadly emarginate with numerous large setigerous punctures. Rising vertically behind the labrum, the clypeus forms a long, posteriorly curved horn. The rugosely punctate horn is rounded anteriorly, flattened posteriorly and lacks the two posterior carinae of *tribuliformis*. A carina is present on each side of the horn running from the posterior base of the horn laterally to a ridge above the mandibular base. Behind the horn is a flattened finely alutaceous impunctate area. Between the eyes the concave vertex is irregularly punctate, each puncture bearing a long red seta. Eye canthi concave with the anterior angles sharply pointed. Eyes divided. The carina behind each eye ending in an abrupt point.

The pronotum is very oddly ornamented. The anterior margin is strongly arched, forming a small median point, which extends slightly over the posterior portion of the head. Behind the



Athyreus martinezi n. sp.

Fig. 1: Holotype, male, dorsal view.

Fig. 2: Holotype, male, lateral view.

Fig. 3: Lateral view of male genitalia.

Fig. 4: Allotype, female, dorsal view.

Fig. 5: Allotype, female, lateral view.

margin on either side of the midline are two deep foveae, the diameter of each being slightly over 2 mm, the interiors of the foveae are smooth and strongly shining, and at their anterior edges, behind the eyes, each bear a small indistinct pit. Between and behind the foveae is a feebly shining smooth area which is bordered posteriorly by two pronounced upright horns. These horns, approximately 3 mm. long are separated at their apices by a distance 0.5 mm. less than the distance between the eyes. Poste-

rior to the two vertical horns is a median horizontal horn which projects posteriorly over the scutellum. Except for an area beneath the horizontal horn, the lateral and posterior portions of the pronotum are rather densely setigerously punctate. Many of the punctures have a small rather vague tubercle at their anterior margins. The setae, which become longer laterally, are dark red in color when viewed from above. On either side of the vertical horns and parallel to the pronotal margins there is a short indistinct carina. The anterior pronotal angles are smoothly rounded while the "posterior" angles are really median in position, the distance between them representing the greatest width of the pronotum. On either side, just above and inside these angles is a small shallow fovea, irregular in outline. The pronotum is margined laterally and posteriorly, laterally having a dense fringe of setae.

The elongate scutellum is yellowish brown and bears many fine setae. The elytra have seven feebly shining carinae between the suture and humeral umbone. The first four of these are very distinct, while the last three are vaguely indicated basally. The intervals between the carinae are flat, setigerously punctate and slightly wider than the width of the carinae. The elytra are dull and finely alutaceous except for the prominent humeral umbones which are smooth and shining.

Pygidium slightly emarginate at tip, yellow in colour, with the surface finely alutaceous and bearing numerous long yellow setae.

Ventral surfaces of head, thorax, and abdomen light yellowish brown in colour and with numerous long yellow setae. Antennal club yellowish with the exterior surface closely setigerously punctate, the setae being short and fine. The interior surface of the club has a smooth circular impunctate area extending from the center to the basal attachment. Between the eyes the mentum is deeply transversely concave, in this area being finely setigerously punctate. The ventral prothorax with large transverse coxal cavities, which are margined in their outer half. Metasternum almost flat with a vague median longitudinal ridge which ends anteriorly in a sharp point between the middle coxae. The surface of the metasternum finely setigerously punctate with the surface between the punctures smooth.

Abdomen with only the last segment visible, the other segments being concealed by the large hind coxae and inwardly

curved elytra. The last abdominal segment is densely setigerously punctate with the setae becoming very long laterally.

Legs with exterior teeth brownish black. Fore tibia with five teeth. Middle and hind tibiae wider apically than the tibiae of *A. bifurcatus*.

Male genitalia with each lateral lobe ornamented with a small footshaped protrusion (see illustration).

Allotype: Female, greatest length 22.5 mm.; greatest width 13.3 mm. Dorsal colour slightly darker than male. The head differs from the male in the following respects: clypeus rising vertically above the labrum forming a transverse carina the width of the clypeus. Behind this carina is a flat rugosely punctate area, bordered posteriorly by a transverse tridentate carina. This posterior carina has a large median tooth with a small lateral tooth on each side. Behind this carina the vertex of the head is sparsely, evenly setigerously tuberculate. Other aspects of the head similar to the male.

The thorax is quite different from the male. There are no horns on the thorax. Instead there is a large central carina shaped like an inverted "U". The base of the "U" forms the center of the anterior prothoracic margin. On either side of the U-shaped carina is a small deep pit almost touching the anterior prothoracic margin. The center of the area enclosed by the U-shaped carina is raised and bears a small V-shaped carina. The base of this carina is directed posteriorly. Posteriorly, between the ends of the U-shaped carina, there is a median longitudinal sulcus extending nearly to the posterior prothoracic margin. Laterally the thoracic configuration is quite similar to that of the male. The thoracic angles are more broadly rounded in the female, but their position is similar. In the female the entire thorax is setigerously tuberculate with the tubercles more pronounced laterally. Also, the setae when viewed from above appear to be dull yellow instead of being dark red as in the male.

The scutellum and elytra of the female do not differ significantly from the male.

The pygidium is broader but otherwise similar to that of the male.

The ventral aspects of the female are similar to that described for the male. However, several abdominal segments are visible. The last segment is densely setigerously punctate and very narrow, while the penultimate segment is broad and smooth posteriorly.

The five teeth of the fore tibia of the female are stubbier than those of the male, but otherwise the legs of the two sexes are generally alike.

Type material: Holotype, male, Peru, ex. coll. Gerstner, 1912 (in the Staatl. Museum f. Naturkunde, Stuttgart). Allotype, female, Peru, ex coll. Gerstner, 1912 (in the Frey Museum, Munich).

Athyreus martinezi is related to *A. tribuliformis* Felsche (1909, p. 760) and *A. zischkai* Martinez (1953, p. 227). The males of the three species in this group can be separated from related South American *Athyreus* by the presence of the long clypeal horn, a pair of large foveae on the anterior portion of the prothorax, behind these foveae two vertical or anteriorly directed horns and behind these horns a third, posteriorly directed horn which often overhangs the scutellum. The females in this group are more difficult to separate but in general the presence of a large U-shaped carina on the prothorax (see illustration) will place the females in the *bifurcatus* or *tribuliformis* groups. The shape of the small carina in the center of the U-shaped carina is usually sufficient for specific identification of the females (see key for the females of the *bifurcatus* group — Martinez 1953, p. 232).

Athyreus martinezi can be easily separated from the two closely related species. In the male of *A. martinezi* the pair of thoracic horns are vertical and separated by a distance slightly less than that of the vertex between the eyes. In both *Athyreus tribuliformis* Felsche and *A. zischkai* Martinez the two horns are strongly inclined anteriorly and are separated by a distance considerably greater than the width of the vertex. The female of *A. martinezi* can be distinguished by the complete U-shaped carina and the small central V-shaped carina with its base pointed posteriorly. The female of *A. zischkai* has an incomplete U-shaped carina and lacks the central V-shaped carina. The female of *A. tribuliformis* is unknown.

A study of the South American species of *Athyreus* poses many problems. The literature in the group consists of short papers scattered through numerous journals. Since the original descriptions were often sketchy and the type material is distributed throughout Europe and America, a comprehensive revision of the group presents many obstacles. Another difficulty encountered is the tremendous diversity, odd ornamentation, and sexual dimorphism found in the group. Long series of specimens would be

most desirable, and the problem is not made easier by the seeming scarcity of specimens in collections.

The writer examined a number of collections and it soon became evident that any attempt to revise the group would be a lengthy process, but not too difficult a one if there were some means of recording by illustration the species in the collections examined. To do this, a rapid method of producing a line drawing suitable for publication was developed, which may be of general interest to workers encountering similar problems.

"Close up" pictures which gave a life-sized image on the negative were taken for the dorsal and lateral aspects of the specimen. Several different cameras which gave the necessary 1:1 ratio were used and proved satisfactory. However, since most species of *Athyreus* are very convex and are ornamented with horns or large carinae, portions of the pictures were always partly out of focus but served to establish the outline of the beetle and the position of the carinae. The dorsal and lateral pictures were enlarged and printed on a 4×5 matte paper (dull finish). The print was then roughed up with an eraser, so that ink (Higgins American Drawing Ink) would adhere to the surface. Following this treatment and with frequent reference to the specimen, all of the important features of the beetle could be quickly inked in. In this way the carinae, outline, foveae, horns, setae, and other features were drawn in and delimited, even though they were not clearly shown in the picture. Once the ink was thoroughly dry, the picture was soaked in water and then treated with a reducer (Farmer's reducer) composed of two solutions. One solution (A) was made by dissolving one gram of potassium ferricyanide in 25 cc. of water. The second solution (B) was composed of 25 grams of sodium thiosulphate (hypo) dissolved in 500 cc. of water. After the picture was thoroughly soaked in water it was placed in solution B, and solution A was added drop by drop until fading of the picture was very noticeable. From that point the picture usually would fade out completely, leaving the ink drawing. After drying, the drawing could be retouched.

There are several advantages and disadvantages to this system. The proportions of the insect are shown accurately; asymmetrical outlines, blemishes, twisting of the head are all recorded, not necessarily making the most pleasing of drawings. The drawing can be done quickly and with little more difficulty than making a tracing. Also, the line drawing can be reproduced more

clearly and cheaply than can a picture. The major disadvantage to the process is the difficulty in producing fine ink lines on photographic paper. This precludes the inclusion of very fine detail - setae for instance, invariably appear rather crude and the drawing looks somewhat diagrammatic. (See plate.) Nevertheless, when all the factors are considered the process is very useful.

Literature Cited

- Felsche, C. 1909. Neue und alte coprophage Scarabaeiden (Col.).
Deutsche Ent. Zeitschrift 1909: 751-765.
- Martinez, Antonio. 1953. Una nueva especie de *Athyreus* (Col. Scarab. Geotrup.).
Mitteilungen der Münchner Ent. Gesellschaft V 43: 226-233.